

REMARKS

General

Inventor Richard Scheps is referred to herein as "Applicant".

U.S. Patent 5,822,047 issued on October 13, 1998 to Contarino et al. is referred to herein as "Contarino."

U.S. Patent 5,082,362 issued on January 21, 1992 to Schneiter is referred to herein as "Schneiter".

U.S. Patent 5,457,639 issued on October 10, 1995 to Ulich et al. is referred to herein as "Ulich."

U.S. Patent 5,117,126 issued on May 26, 1992 to Geiger is referred to herein as "Geiger".

U.S. Patent 5,506,616 issued on April 9, 1996 to Scheps is referred to herein as "Scheps '616."

Status of Claims

Claims 1-7 are pending in the application.

Claims 1-3, 5 and 7 are rejected under 35 U.S.C. §102(b) for anticipation by Ulich.

Claim 2 is rejected under 35 U.S.C. §103(a) for obviousness over Ulich in view of Contarino.

Claim 4 is rejected under 35 U.S.C. §103(a) for obviousness over Ulich in view of Schneiter.

Claim 6 is rejected under 35 U.S.C. §103(a) for obviousness over Ulich in view of Geiger.

Summary

Claims 1-7 remain in the application. Applicant respectfully requests reexamination and reconsideration of all claims.

Response to Rejection of Claims 1-3, 5 and 7 under 35 U.S.C. §102(b)

Reference is made to M.P.E.P. §2131, which states:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."
Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Claims 1-3, 5 and 7 are rejected under 35 U.S.C. §102(b) for anticipation by Ulich. Applicant respectfully traverses this rejection for the following reasons. The rejection is inconsistent with the applicable M.P.E.P. requirements because Ulich neither discloses nor claims all elements of Applicant's claimed invention. Ulich describes a classical lidar system that illuminates the target with a single pulse, which is brief enough to permit simple discrimination of ocean surface and submerged target [col. 3 at line 60 to col. 4 at line 3] but Ulich neither considers nor suggests the concurrent **temporal and spatial discrimination** of lines and pixels as taught and claimed by Applicant in the present application. The "spatial discriminator" aspect of the "line scan" element of Applicant's invention is described at page 6 at lines 11-13 of the specification and is neither taught nor suggested by Ulich. The Ulich reference to "spatial resolution" [e.g., col. 4 at line 42] involves the sophisticated statistical processing [set forth in cols. 9-15] of a series of overlapping "swaths 30" and does not consider line or pixel discrimination as taught by Applicant. In fact, Ulich specifically teaches against the detection concept exploited by Applicants invention, observing that "attempts at scene reconstruction using flying spot scanner and high pulse repetition frequency sensors have suffered due to . . ." [col. 7 at lines 18-22]. As claimed, Applicant teaches a "line-scan" technique for accumulating a matrix of pixels making up a complete visual image of the underwater target (Applicant claims an "imaging" lidar). This invention uses the "line scan" technique to scan the area containing the target and to generate a "scanned" image of the target. Applicant, by discovering the combinations disclosed and claimed, has for the first time found a workable system for accomplishing what the Ulich disclosure dismisses as unworkable; in fact, Ulich provides an immensely complicated mathematical method for achieving results less useful than those available from Applicant's invention.

The claimed "temporal discriminator" aspect of the range "gating" element of this invention is described at page 6 at lines 13-21 of the specification and is neither taught nor suggested by Contarino or Ulich. Ulich fails to anticipate the "line" scan element of Applicant's invention, thereby failing to meet the above requirement for rejection under 35 U.S.C. §102. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. §102(b) rejections of claims 1, 3, 5 and 7.

Response to the rejections of claim 2 under 35 U.S.C. §103(a)

Reference is made to M.P.E.P. §706.02, which states:

“After indicating that the rejection is under 35 U.S.C. §103, the examiner should set forth in the Office Action (1) the relevant teachings of the prior art relied upon, preferably with the reference to the relevant column or page number(s) and line number(s) where appropriate, (2) the difference or differences in the claim over the applied reference(s), (3) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and (4) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification.”

Claim 2 is rejected under 35 U.S.C. §103(a) for obviousness over Ulich in view of Contarino. Applicant respectfully traverses this rejection for the following reasons. The rejection is inconsistent with the applicable M.P.E.P. requirements because there is no *prima facie* case of obviousness recited in the Office Action in that there is no citation of any suggestion in the art for combining the teachings of Ulich and Contarino. Examiner’s suggestion that the advantages of the blue-green color element themselves constitute sufficient motivation to constitute a *prima facie* case of obviousness appears to instead rely on hindsight; using Applicant’s disclosure as a road-map for suggesting combinations of elements individually known in the art but heretofore unknown in combination.

Moreover, even when combined, these teachings do not include every element of Applicant’s invention as claimed, and do not appear to lead to **any** advantageous result, which is consistent with a lack of suggestion or motivation for such combination. The above discussion demonstrates that Ulich does not anticipate all elements of the base claim 1 from which Applicant’s claim 4 depends. As described above in detail, Ulich neither considers nor suggests the concurrent **temporal and spatial discrimination** of lines and pixels as taught and claimed by Applicant in the present application and appears to teach against line/pixel scanning. Although Ulich suggests pulse lengths shorter than 20 nanoseconds [col 5 at line 11], neither Ulich nor Contarino neither teaches nor suggests the **range-gating** element of the invention as taught and claimed by Applicant in the present application. This is not to be confused with mere “gating,” which is a generic term of wide application. As described in the specification at page 6, “range gating” is distinct from and should not be confused with the “ranging” concept used by Contarino. The brief light echo signal received during the “receive gating” period corresponds to a single “pixel” within a temporal “slice” of the target. Conversely, as clearly taught by Ulich and Contarino, **ranging** denominates a process where a clock, which was started upon the launch of a laser pulse toward a target, is halted upon detection

of light back-scattered from the target so that the round-trip transit time can be used to determine the distance to the target. The detector for a ranging application is never blocked, which allows backscattered light to enter the detector for the entire duration of the laser pulse transit, increasing noise and preventing any “temporal discrimination” of imaging data. Being without this element, Ulich is obliged to incorporate sophisticated stochastic signal processing to derive expected values of echo signal levels over time from a series of overlapping pulsed zonal illuminations so that a rough “image” can be calculated at great effort. Although Contarino is unconcerned with imaging, the absence of the “range gating” technique obliges him to add a radar modulation of his single laser pulse to permit stochastic analysis (needed to compensate for the lack of available temporal discrimination) of the ranging echo to improve target detection performance [col. 9]; a measure that is unnecessary in view of Applicant’s teachings in the present application. The claimed “temporal discriminator” aspect of the range “gating” element of this invention is described at page 6 at lines 13-21 of the specification and is neither taught nor suggested by Contarino or Ulich. Accordingly, the office action fails to propose any combination of references sufficient to arrive at the claimed subject matter.

The Office Action also fails to recite or particularly point out any suggestion in the prior art for making the proposed combination, thereby failing to explain why such proposed combination would have been obvious. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. §103(a) rejection of claim 2.

Response to the rejections of claim 4 under 35 U.S.C. §103(a)

Reference is made to M.P.E.P. §706.02, which states:

“After indicating that the rejection is under 35 U.S.C. §103, the examiner should set forth in the Office Action (1) the relevant teachings of the prior art relied upon, preferably with the reference to the relevant column or page number(s) and line number(s) where appropriate, (2) the difference or differences in the claim over the applied reference(s), (3) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and (4) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification.”

Claim 4 is rejected under 35 U.S.C. §103(a) for obviousness over Ulich in view of Schneiter. Applicant respectfully traverses this rejection for the following reasons. The rejection is inconsistent with the applicable M.P.E.P. requirements because there is no *prima facie* case of

obviousness recited in the Office Action in that there is no citation of any suggestion in the art for combining the teachings of Ulich and Schneiter. Examiner offers no reference nor authority that proposes combining the teachings of Ulich and Schneiter in any manner for any purpose. Examiner's suggestion that the advantages of the laser pulse rate element themselves constitute sufficient motivation to constitute a *prima facie* case of obviousness appears to instead rely on hindsight; using Applicant's disclosure as a road-map for suggesting combinations of elements individually known in the art but heretofore unknown in combination.

Moreover, even when combined, these teachings do not include every element of Applicant's invention as claimed, and do not appear to lead to **any** advantageous result, which is consistent with a lack of suggestion or motivation for such combination. The above discussion demonstrates that Ulich does not anticipate all elements of the base claim 1 from which Applicant's claim 4 depends. The proposed combination of Ulich and Schneiter is missing several elements of Applicant's claim 4. Applicant respectfully asserts that Schneiter in fact neither teaches nor suggests a lidar target imaging device but instead discloses video camera system. Moreover, although Schneiter mentions an **encoder** pulse rate that does not exceed 500 kHz, Applicant respectfully asserts that this encoder rate is completely unrelated to the claimed **pulse laser** repetition rate (an encoder operates to report the position of a moving shaft and a pulse laser operates to emit light pulses). Applicant's claim 4 clearly specifies that the pulse laser rate of the imaging lidar is preferably greater than 600KHz. Nothing in the Schneiter reference in any way suggests the operating of an imaging lidar (or anything else) above 600 KHz; even the Schneiter encoder chip operates no higher than 500 KHz. Accordingly, the office action fails to propose any combination of references sufficient to arrive at the claimed subject matter.

The office action also fails to recite or particularly point out any suggestion in the prior art for making the proposed combination, thereby failing to explain why such proposed combination would have been obvious. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. §103(a) rejection of claim 4.

Response to the rejections of claims 6 under 35 U.S.C. §103(a)

Reference is made to M.P.E.P. §706.02, which states:

"After indicating that the rejection is under 35 U.S.C. §103, the examiner should set forth in the Office Action (1) the relevant teachings of the prior art relied upon, preferably with the reference to the relevant column or page number(s) and line

number(s) where appropriate, (2) the difference or differences in the claim over the applied reference(s), (3) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and (4) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification.”

Claim 6 is rejected under 35 U.S.C. §103(a) for obviousness over Ulich in view of Geiger. Applicant respectfully traverses this rejection for the following reasons. The rejection is inconsistent with the applicable M.P.E.P. requirements because there is no *prima facie* case of obviousness recited in the Office Action in that there is no citation of any suggestion in the art for combining the teachings of Ulich and Geiger. Examiner offers no reference nor authority that proposes combining the teachings of Ulich and Geiger in any manner for any purpose. Examiner’s suggestion that the advantages of the periodically-poled crystal element themselves constitute sufficient motivation to constitute a *prima facie* case of obviousness appears to instead rely on hindsight; using Applicant’s disclosure as a road-map for suggesting combinations of elements individually known in the art but heretofore unknown in combination.

Moreover, even when combined, these teachings do not include every element of Applicant’s invention as claimed, and do not appear to lead to any advantageous result, which is consistent with a lack of suggestion or motivation for such combination. The above discussion demonstrates that Ulich does not anticipate all elements of the base claim 1 from which Applicant’s claim 6 depends. The proposed combination of Ulich and Geiger is missing several elements of Applicant’s claim 6. Applicant respectfully asserts that Geiger neither teaches nor suggests a periodically-poled crystal pulsed laser but instead describes a multi-crystal parametric optical oscillator. In fact, periodically-poled crystal material of the type described and claimed by Applicant in the present application was not commercially-available until 1998, about eight years after the filing date of the Geiger reference, and could not have been considered by Geiger as part of his compilation of suggested commercially-available materials. Accordingly, the office action fails to propose any combination of references sufficient to arrive at the claimed subject matter.

The office action also fails to recite or particularly point out any suggestion in the prior art for making the proposed combination, thereby failing to explain why such proposed combination would have been obvious. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. §103(a) rejections of claim 6.

Conclusion

For the reasons set forth above, Applicant respectfully requests reexamination and reconsideration of claims 1-7. Applicant respectfully solicits allowance of claims 1-7 at an early date. There is no fee required for this amendment and response.

Respectfully submitted,



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